

530,777

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



Rec'd PCT/PTO 07 APR 2005



(43) International Publication Date  
21 May 2004 (21.05.2004)

PCT

(10) International Publication Number  
**WO 2004/042857 A1**

(51) International Patent Classification<sup>7</sup>: **H01M 8/06, B01J 20/34**

Valentina Nikolaevna [RU/RU]; ul. 2-ya Shatskaya, 4-9, 392008 Tambov (RU).

(21) International Application Number:  
PCT/RU2003/000469

(74) Agent: "GORODISSKY & PARTNERS LAW FIRM" LTD.; EGOROVA Galina Borisovna, B.Spasskaya ul., 25, stroenie 3, 129010 Moscow (RU).

(22) International Filing Date:  
4 November 2003 (04.11.2003)

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(25) Filing Language: English

(84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(26) Publication Language: English

**Published:**

— with international search report

(30) Priority Data:  
2002129372 5 November 2002 (05.11.2002) RU

(71) Applicant (*for all designated States except US*): ZAKRYTOE AKTSIONERNOE OBSCHESTVO "INDEPENDENT POWER TECHNOLOGIES" [RU/RU]; Moskovsky pr-t, 78, lit.A, pom.2N, 196084 St.Petersburg (RU).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): KARICHEV, Ziya Ramizovich [RU/RU]; Kuchin pereulok, 12-1, 129626 Moscow (RU). BLATOV, Dmitry Alexandrovich [RU/RU]; pr-t Mira, 54-111, 129110 Moscow (RU). SIMANENKOV, Stanislav Ilich [RU/RU]; ul. B.Fedorova, 1a-110, 392000 Tambov (RU). SHUBINA,

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: METHOD AND DEVICE FOR PURIFYING AIR FOR FUEL CELLS

WO 2004/042857 A1

(57) **Abstract:** The invention relates to auxiliary systems ensuring functioning of alkaline fuel cell (AFC), in particular to a method and device for sorptive purification of air used in an AFC of carbon dioxide. In accordance with the invention, in the method for purifying air for a fuel cell, the starting air is passed through an adsorber with an adsorbent of carbon dioxide, then the adsorbent is regenerated. After utilization the adsorbent comprising hydrated oxides of transition metals is regenerated at a temperature of 60 - 120°C by the air spent in the fuel cell. The air fed for regeneration is heated until a relative humidity of from 15 to 85% is achieved. A device for purifying air for fuel cells comprises an air flow blower connected by means of pipelines and a stop valves to adsorbers provided with an adsorbent of carbon dioxide and connected to an air inlet of a fuel cell, wherein the stop valve is made in the form of switches that provide for the sequential connection of the inlet and outlet of one of the adsorbers to the air flow blower and to the air inlet of the fuel cell respectively, and the outlet of the other adsorber through a heater to the air outlet of the fuel cell. A device for purifying air for fuel cells, comprising an air flow blower, connected by means of pipelines to adsorbers provided with an adsorbent of carbon dioxide and connected to an air inlet of a fuel cell may be made so that the adsorbers, separated one from another by partitions, are positioned in one housing with the possibility of rotating about a longitudinal axis and sequentially connecting at an inlet to the air flow blower and at an outlet through a heater to an air outlet of the fuel cell. The adsorbers may be provided with an adsorbent comprising hydrated zirconium oxide. Thermal insulation may be arranged inside the adsorbers and heaters.